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SDI-12 and Multi-parameter Instruments

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SDI-12 version 1.4 was first published by the SDI-12 Support Group on January 10, 2019. The updated specification can be found at the website http://sdi-12.org/specification.php and manufacturers are gradually implementing the updated specification in their product lines. Recently, an issue came up where a DCP, manufactured by Sutron, could not collect data from a YSI EXO multi-parameter sonde using the M! (measure) command after the DCP received a firmware update employing SDI-12 version 1.4.

When the M! command is sent to the instrument, it responds with **atttn**, where a=address, ttt=time in seconds to complete the measurement, and n=number of parameters to be returned. Since "n" is only one digit, it allows for a maximum of 9 parameters. However, many manufacturers ignore the single-digit and allow their instrument to respond with more than nine parameters when the M! command is issued. This creates a problem when a manufacturer of the instrument making the request strictly adheres to the protocols. In this case, the response from the multi-parameter instrument is invalid, and no data are collected (fig. 1).

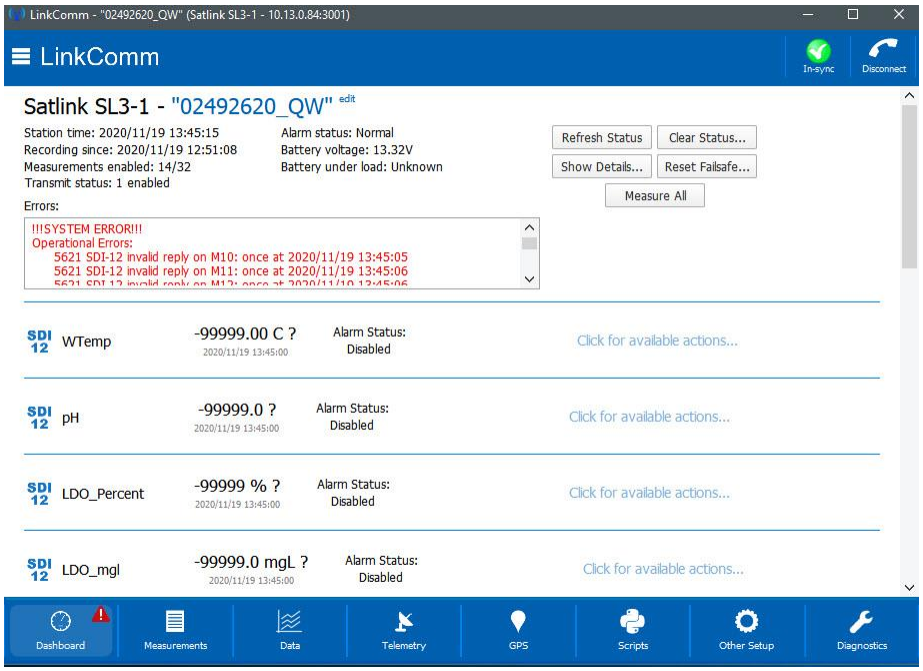

Figure 1. M! command returning invalid replies.

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The proper method for collecting data from an instrument with more than nine parameters is to use the C! (concurrent measurement) command. Using this command, the instrument responds with **atttnn** which allows for greater than 9 values in response. Multi-parameter instruments typically take longer to make their measurements, so it makes sense to use the C! command, especially where more than one instrument is deployed. Using C! commands, the instruments can all be making measurements simultaneously, reducing the amount of lag from your measurement interval.

Remember, M! commands are issued by the DCP sequentially, so the instrument must finish and return its values before the DCP moves onto the next instrument. This can create a significant time lag as some instruments take two minutes or more to measure and return data to the DCP! Using C! commands means that the total time to retrieve data from your instruments will only be as long as the slowest instrument to respond.

Adherence to the specification is critical for all SDI-12 instruments to be queried by SDI-12 capable loggers and DCP's. Manufacturers should strive to ensure their equipment is fully compatible and not expect others to create workarounds due to any oversight in their implementation.

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